Amount of Mn absorbed (in µg) per day from the non-respirable particulate in the air-of East Liverpool in comparison to the daily amount of Mn absorbed from food intake

Worst case scenario:

Participant ID 245, 2006 annual exposure to air-Mn (WP-TSP): 2.9705 µg Mn/m³ (TSP)

65 % of WP-TSP is non-respirable (NR) particulate: 2.9705 x 65/100 = 1.931 µg Mn/m³ (NR)

Default variables for both sexes:

- respiration rate: 20 m³/day
- GI absorption of Mn (no Fe deficiency): 5 %
- 100 % deposition of NR particulate in upper airways
- 100 % mucociliary clearance and swelling down of NR particulate

Amount of Mn from NR particulate deposited in lung and eventually swollen down per day:

1.931 µg/m³ x 20 m³ = 38.62 µg Mn/day

Daily amount of Mn systemically absorbed from the GI: 38.62 µg Mn/day x 5/100 = **1.931 µg Mn/day**

For comparison with daily absorption of Mn from food intake:

average amount of oral intake of Mn with food: 3.5 mg Mn/day (WHO)

amount of Mn systemically absorbed from the GI: 3.5 mg Mn/day x 5/100 = **175 µg Mn/day**

Ratio (in %) between the daily amount of Mn absorbed systemically from NR particulate and that from oral food intake: 1.931/175 = 1.1 %

Conclusion:

The GI absorption of Mn from NR particulate in East Liverpool can be neglected in comparison to that from daily food intake, as it represents no more than 1 %.